NORTH PACIFIC OCEAN.

By WILLIS E. HURD.

Following upon the extremely stormy weather which characterized so many of the days of October, there came somewhat of a lull in the intensity of the winds, and reports indicate that not until early in December did full hurricane blasts again sweep the North Pacific Ocean.

November, however, could hardly be considered as a quiet month. The Aleutian LOW was generally well developed, and in consequence rough weather was experienced along the northern sailing routes. In addition, cyclonic or anticyclonic gales occurred in tropical waters off the Mexican coast and in the Far East. The activity of the winds may well be summarized in the statement that gales occurred daily over some part of the ocean, usually of force 7 to 9, but here and there rising to 10 or 11. It may be well to remark, however, that despite this considerable storminess, many a vessel accomplished its trans-Pacific voyage in fine weather without hindrance from wind and wave.

On the 1st day of November, and continuing into the 2d, gales occurred over the Japan Sea and along the China coast. Those in the more northern waters were caused by the passage of a cyclone across the archipelago to the eastward. In the Eastern Sea and continuing southward through the Formosa and Balintang Channels, the northeast monsoon, accentuated by the approaching continental anticyclone, was blowing with a force of 7 to 9. On the 7th, 8th, and 9th, according to reports from the Japanese S. S. *Keifuku Maru*, a moderate east-northeasterly gale was blowing over the northern portion of the China Sea.

On the 16th, 17th, and 18th, according to United States Weather Bureau weather maps a depression of considerable intensity was crossing the central Philippines. No vessel reports of the storm, which seems to have been a severe typhoon, have been received at this office, but an account of it, written by an official of the Philippine Weather Bureau, appears on page 597 of this REVIEW. This seems to have been the only tropical disturbance of the month.

Severe gales frequently swept the Gulf of Tehuantepec. At Salina Cruz they usually came from the north, but over the lower reaches of the gulf were variously from west-northwest to east-northeast. Vessel reports indicate gales of force 7 to 9 in this region on the 6th, 10th, 11th, and 12th. Those of the last three days were accompanied by a slight barometric depression. All were of a type peculiar to the locality.

Coming into the Hawaiian region, we find that two depressions, originating to the eastward, affected the weather of these islands. The first, an indefinite trough lying midway between Hawaii and California on the 4th, gathered some energy on the 5th and became central as a secondary depression to the southeastward of the Aleutian LOW, and near 40° N., 140° W. Several vessels in this region reported southeasterly gales, force 9 to 10, on the 5th. Farther to the southwestward northerly gales occurred. The American S. S. *Mauna Ala*, near latitude 26° N., longitude 148° W., experienced such a gale, force 8, with only a moderate depression of the barometer. At Honolulu the maximum wind velocity for November, 36 miles from the northeast, occurred at this time. The storm was dissipated, or combined with the Aleutian center, a day or two later. The second disturbance alluded to was probably generated to the eastward of Hawaii on the 16th and gave Honolulu its lowest pressure for the month. Few gales attended its slow northward movement.

Fine, clear weather prevailed over the Hawaiian Islands. This November was one of the warmest on record at Honolulu. The total rainfall was only 0.40 inch, or the second lowest in a record kept since 1877.

For the month as a whole pressure was below normal over the eastern part of the ocean, the largest relative departure occurring in the Aleutian area. At Dutch Harbor the average of the p. m. observations was 29.35 inches, or 0.24 inch below the normal. This was only a slight recovery from the record low pressure of the preceding month, when the departure was −0.41 inch. The highest reading, 29.94, was recorded on the 27th and 28th; the lowest, 28.82, on the 1st. The absolute range, 1.12 inches, was small for the time of year. At Midway Island the average pressure was 30.04 inches (28 days). This is 0.06 inch below the average for 12 years. There is a curious rise in pressure at this station in November, the normal for the month being 30.10 inches, whereas in October it is but 30.02 and in December 30.01. This year the highest reading, 30.30, was recorded on the 30th; the lowest, 29.72, on the 24th. Pressure was continuously below normal from the 15th to the 28th. At Honolulu the average p. m. pressure was 29.99 inches, or 0.03 inch below normal. The highest reading, 30.10, was recorded on the 27th; the lowest, 29.81, on the 16th.

The most frequent, as well as the strongest, gales experienced by vessels traversing the northern routes occurred between latitudes 40° and 50° N. and longitudes 160° E. and 170° W. This region lay in the southwestern quadrant of the average Aleutian center for November, and the strongest winds sweeping it were therefore largely from westerly to northwesterly directions. In the region to the southward of the Gulf of Alaska gales came more frequently from southwesterly to southeasterly directions.

The American cargo and passenger S. S. *Northwestern*, Capt. C. A. Glascock, Observer H. P. Timmers, third officer, cruised throughout the month in the waters of the northern part of the Gulf of Alaska. This vessel reported much rain and snow, and strong winds on the 5th, 8th to 11th, and 25th to 27th. On the 26th, while at Seward, a northeast gale, force 11, lowest pressure 28.53 inches, was encountered. The gale changed to southwesterly late on the 26th as the storm center moved northward into Alaska. The reading, 28.53 inches, was the lowest observed over the northern waters of the Pacific during the month.

Over the trans-Pacific routes the Japanese cyclone of the 1st gave some gales to the eastward up to the 4th, when it merged with the Aleutian center, then not far from 50° N., 175° E. The main gale area during the first three days of the month, however, was between 40° and 45° N., and 140° and 155° W. The highest wind force reported for this period was 10 from the west-northwest, lowest pressure 29.57, noted in 44° 12′ N., 147° 15′ W., by the British S. S. *Tascalusa*.

From the 5th to the 8th the Aleutian cyclone was over or to the eastward of Dutch Harbor, but on the 9th an eastward impulse carried the main storm center as a small LOW into eastern Alaska, while another center was gathering energy over the lower waters of Bering Sea. This in turn moved eastward, and from the 11th until the 14th occupied most of the Gulf of Alaska and adjacent waters to the southward, causing moderate to strong gales from near the Washington coast westward to the 170th meridian W.

The American S. S. *Eldridge*, Capt. F. W. Brooks, Observer R. B. Devenpeck, Taku, China, toward Seattle, was involved on the 8th to 11th in a cyclone which, on the 7th, was leaving the Japanese coast. On the 11th the wind, which was of irregular strength, attained its maximum observed force, 11 from the west-northwest, in 49° 55′ N., 178° 15′ W. From the 11th to the 13th the American S. S. *President Jefferson*, Capt. F. R. Nichols, Observer C. H. Moen, Orient toward Seattle, encountered rough weather, the highest wind force of which, SSE. 10, occurred in 52° N., 145° W., on the 11th. The Japanese S. S. *Fukuyo Maru*, Capt. A. Tokagi, Observer S. Terasaki, experienced a whole gale from the west-southwest in 39° 41′ N., 155° 34′ W., on the 13th, lowest pressure 29.48. The lowest pressure observed during the period, 7th to 14th, was 28.57 inches, read on board the British S. S. *Harold Dollar*, on the 13th, in latitude 46° 30′ N., longitude 161° W., during a strong north to northeast gale.

On the 16th the Aleutian LOW reached its maximum activity, and no gales were that day reported from northern waters. On the 17th the great storm center began to deepen and gales again set in to the southward of the Aleutians in both east and west longitudes. On the 18th pressure dropped below 29.00 inches at Dutch Harbor, and in latitude 47° 23′ N., longitude 172° 13′ E., the Japanese S. S. *Africa Maru* fell in with fresh to strong gales which culminated in a force of 11 from the west-by-north, lowest pressure 28.66 inches.

On both the 20th and 25th storms entered the ocean over northern Japan, occasioning gales over a considerable area to the eastward. Through the latter of these storms particularly, moderate to strong gales occurred from the 26th to the 28th over a stretch of sea embraced between the 35th and 45th parallels, 150th and 170th meridians of east longitude. On the 27th to the 30th the gale area extended between the 35th parallel and the Aleutians, as far eastward as 170° W.

Gales also occurred off the American coast to the northward of California on the 22d to the 24th, owing to the cyclone which, appearing to the westward of British Columbia on the 22d, moved inland on the 23d and 24th. But the highest wind velocities, force 10 from a northwesterly direction, noted over the main traversed routes during the last decade of November occurred on the 28th near 45° N., between 160° and 170° E., and were reported by the American S. S. *Dewey* and the British S. S. *Empress of Canada*.

At the close of the month an extensive anticyclone was moving eastward from Mongolia, and pressure was high in midocean below the 40th parallel, and along the central portion of the Hawaii-San Francisco route. A cyclone was central over the Kuriles, and another of considerable intensity lay at 8 p. m. of the 30th over the Gulf of Alaska.

Fog seems to have diminished considerably in frequency this month as compared with October. This decrease was especially noticeable in east longitudes, where fog was reported as having occurred on only five days over the area embraced between the 40th and 50th parallels and the 180th meridian and the Japanese coast. Some fog was reported in the eastern part of the Gulf of Alaska; near Puget Sound and Vancouver on six days; and outside San Francisco Harbor on four days.

FOUR TYPHOONS IN THE FAR EAST DURING OCTOBER, 1923.

By REV. JOSÉ CORONAS, S. J.

[Weather Bureau, Manila, P. I.]

Four typhoons were shown by our weather maps of the Far East during the first half of the month of October, although only one of them influenced the weather in the Philippines, the other three being rather typhoons of the Ladrone or Caroline Islands. There was not a single typhoon noticed after the 12th.

The first typhoon appeared on the 2d to the south of Guam in about 10° latitude N. and 145° longitude E. It moved northwestward between Guam and Yap on the 3d; it inclined to NNW. on the 4th, and it probably filled up on the 7th not far from 134° or 135° longitude E., 23° or 24° latitude N.

The second typhoon was simultaneous with the preceding one and was quite clearly shown by the observations of Guam on the 3d and 4th. We have no means to decide whether it was a well-developed typhoon or only a depression. Its center was about 150 miles to the NNE. of Guam on the 3d, moving NW. It probably recurved northeastward on the 4th near 144° longitude E. and 18° latitude N. It was impossible to follow it after the 5th.

The third and most important typhoon of the month was shown by our weather maps on the 5th to the E. of central Luzon in about 130° longitude E. and near 16° latitude N. After moving slowly W. by N. for about two days, it took on the 7th a decided northerly direction, thus dispersing the danger for the Philippines; the center was then about 250 miles east of Luzon not far from 126° longitude E. The typhoon moved NNE. on the 8th and NE. on the 9th and the following days. When the center was passing close to the Loochoos on the 9th, our weather maps showed that it was a very well developed and intense typhoon. The center passed close to the southeastern coast of Japan on the 11th.

The approximate positions of the center at 6 a. m. of 8th to 11th are as follows:

October 8th, 6 a. m. 20° 30′ latitude N., 126° 20′ longitude E.
October 9th, 6 a. m. 24° 35′ latitude N., 127° 35′ longitude E.
October 10th, 6 a. m. 28° 25′ latitude N., 132° 15′ longitude E.
October 11th, 6 a. m. 33° 50′ latitude N., 139° 45′ longitude E.

The fourth typhoon was altogether simultaneous with the one of the Loochoos just mentioned. It appeared on the 5th and 6th to the NE. of Guam in about 17° latitude N. and 150° longitude E. It moved NNW. and recurved northeastward on the 9th. At 6 a. m. of the 9th the center was situated about 200 miles east of the Bonins.

A DESTRUCTIVE TYPHOON IN THE PHILIPPINES, NOVEMBER 16 TO 18, 1923.

By Rev. JOSÉ CORONAS, S. J.

[Weather Bureau, Manila, P. I.]

This typhoon was clearly shown by our weather map of the 15th, 6 a. m., about 200 or 250 miles to the east of the southern part of Samar near 139° longitude E. and 11° latitude N. It moved at the beginning W. by N., reaching the central part of Samar in the morning of the 16th. The center traversed Samar in a westerly direction, passing close to our stations of Borongan, Catbalogan, and Calbayog, and causing great damage